

AMENDMENT TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in this application.

1. (currently amended) A device for connecting a longitudinal carrier to a bone screw fixation means, the device comprising:

a connection element having a central axis, an external surface, an upper end, a lower end, a first cavity extending coaxially along the central axis from the upper end to the lower end, the first cavity having a shoulder ~~reduced diameter portion~~ at the lower end ~~forming at least one shoulder therein~~, and a first channel passing through the connection element transversely to the central axis for receiving the longitudinal carrier;

a sealing cap having a front end, a rear end, a second cavity opening at the front end for receiving the connection element, and a second channel extending transversely to the central axis and opening towards the front end of the sealing cap, the second cavity including an internal surface; and
a set screw threadably coupled to ~~tensioning means for engaging~~ the rear end of the sealing cap for securing the position of the longitudinal carrier inserted in the first channel;

wherein the external surface of the connection element and the internal surface of the second cavity formed in the sealing cap include complementary ~~arresting means~~ non-threaded bulges and depressions for securing the sealing cap to the connection element, the bulges and depressions providing a plurality of discrete axial latch positions parallel to the central axis, each successive latch position axially displacing the sealing cap over the connection element, the bulges and depressions

~~complementary arresting means~~ extending continuously, concentrically, and non-threadingly around the central axis on the connection element external surface and the sealing cap internal surface, the concentric continuity of the bulges and depressions ~~arresting means~~ interrupted by the first and second channels, and

~~the device further includes a securing element engaging a head of means to prevent the bone screw to prevent the bone screw fixation means~~ from passing through the upper end of the connection element through the first cavity prior to attachment of the sealing cap to the connection element;

~~wherein the complementary arresting means includes complementary non-threaded projections and recesses for securing the sealing cap to the connection element, the projections and recesses providing a plurality of discrete axial latch positions parallel to the central axis, each successive latch position axially displacing the sealing cap over the connection element.~~

2. (currently amended) The device according to claim 1, wherein the bulges and depressions ~~arresting means~~ are arranged orthogonal to the central axis on the external surface periphery of the connection element and on the internal surface ~~the periphery~~ of the second cavity in the sealing cap.

3. (cancelled)

4. (original) The device according to claim 1, wherein the shoulder has a level bearing surface of circular-ring shape.

5. (original) The device according to claim 1, wherein the sealing cap further includes two slots arranged orthogonal to the second channel, the slots extending from the front end of the sealing cap.

6.-8. (canceled)

9. (currently amended) The device according to claim 1, wherein the securing element means comprises a pin, and the connection element has a hole extending into the connection element and from the first cavity, the hole extending generally and transverse to the central axis, the pin being sized and configured to be pressed into the hole.

10. (currently amended) The device according to claim 1, wherein the securing element means comprises a snap ring sized and configured to be received within a corresponding groove formed on the connection element bone fixation means.

11.-14. (cancelled)

15. (currently amended) The device of claim 21, further comprising:

11 wherein the tensioning means comprises a set screw threadably coupled to the sealing cap for securing the position of the longitudinal carrier received within the first channel.

16. (currently amended) The device of claim 21,11 further comprising:

a securing means element to prevent the bone screw fixation means from passing through the upper end of the connection element through the first cavity prior to attachment of the sealing cap to the connection element.

17. (previously presented) The device of claim 16 wherein the securing element means comprises a pin, and the connection element has a hole extending into the connection element and from the first cavity, the hole extending generally and transverse to the central axis, the pin being sized and configured to be pressed into the hole.

18. (currently amended) The device of claim 1, [11] wherein the bulges and depressions ~~projections and recesses~~ have a saw-tooth shaped profile when viewed in a cross-section surface parallel to the central axis.

19. (currently amended) A device for connecting a longitudinal carrier to a bone screw fixation means, the device comprising:

a connection element having a central axis, an external surface, an upper end, a lower end, a first cavity extending ~~coaxially along the central axis~~ from the upper end to the lower end, the first cavity having a shoulder reduced diameter portion at the lower end ~~forming at least one shoulder therein~~, and a first channel passing through the connection element transversely to the central axis for receiving the longitudinal carrier;

a sealing cap having a front end, a rear end, a second cavity opening at the front end for receiving the connection element, and a second channel extending transversely to the central axis and opening towards the front end of the sealing cap, the second cavity including an internal surface, the sealing cap further including two slots arranged generally perpendicular to the second channel, the slots extending from the front end of the sealing cap toward the rear end; and

a set screw threadably coupled to ~~tensioning element~~ means for engaging the rear end of the sealing cap for securing the position of the longitudinal carrier inserted in the channel with respect to the connection element; wherein[[:]] the external surface of the connection element has a plurality of bulges formed thereon, the plurality of bulges positioned on planes that are generally perpendicular ~~aligned parallel~~ to the central axis;

the internal surface of the second cavity formed in the sealing cap has a plurality of depressions formed therein, the plurality of depressions ~~aligned parallel~~ positioned on planes that are generally perpendicular to the central axis and complementary to the plurality of bulges; and

the sealing cap ~~is sized and configured to~~ engages the connection element such that each ~~of the plurality of bulges~~ of the connection element is operative to snap-fit into at least one ~~of the plurality of depressions~~ of the sealing cap, the bulges and depressions providing a plurality of discrete axial latch positions parallel to the central axis, each successive latch position axially displacing the sealing cap relative to the connection element, wherein the bulges and depressions extend continuously, concentrically, and non-threadingly around the central axis on the external surface of the connection element and the internal surface of the sealing cap, the bulges and depressions interrupted by the first and second channels and interrupted by the two slots on the sealing cap.

20. (previously presented) The device of claim 19 wherein the bulges and depressions have a saw-tooth shaped profile when viewed in a cross-section surface parallel to the central axis.

21. (New) A device for connecting a longitudinal carrier to a bone screw, the device comprising:

a connection element having a central axis, an external surface, an upper end, a lower end, a first cavity extending from the upper end to the lower end, and a first channel passing through the connection element transversely to the central axis for receiving the longitudinal carrier; and

a sealing cap having a front end, a rear end, a second cavity opening at the front end for receiving the connection element, and a second channel extending transversely to the central axis and opening towards the front end of the sealing cap, the second cavity including an internal surface, the sealing cap further including at least two slots arranged generally perpendicular to the second channel, the slots extending from the front end toward the rear end of the sealing cap, the external surface of the connection element and the internal surface of the second cavity formed in the sealing cap including at least first and second bulges and at least first and second complementary depressions for securing the sealing cap to the connection element, the bulges and depressions provide at least first and second axial positions of the sealing cap relative to the connection element, the bulges and depressions extend continuously, concentrically, and non-threadingly around the central axis on the external surface of the connection element and the internal surface of the sealing cap, the bulges and depressions interrupted by the first and second channels and by the at least two slots formed in the sealing cap, the first and second positions are axially displaced from one another and the sealing cap is placed in the first position by displacing the sealing cap over the connection element such that a first bulge engages a first depression, the cap being movable from the first position to the second position by further displacing the sealing cap

axially so that the first bulge engages a second depression and a second bulge engages the first depression.